

Ocean Color Level-3 Browse Products

1.0 Introduction

This document describes the specifications of Ocean Color Level-3 browse products which are produced and distributed by the NASA Goddard Space Flight Center's Ocean Color Data Processing System (OCDPS). The products are implemented in the Hierarchical Data Format (HDF), and HDF terminology is used in this document.

These specifications are given in terms of the logical implementation of the products in HDF and are not a physical description of file contents. Therefore, HDF software must be used to create or read these products.

A Level-3 browse product is generated from a corresponding chlorophyll a SMI product. The main data contents of the product are a subsampled version of the SMI image array, **l3m_data**, stored as one byte per pixel. Each Level-3 browse product is stored in one physical HDF file.

2.0 Naming Convention

The root file name of a Level-3 browse product corresponds to that of its parent SMI product, indicating the binning period as part of the name. The file name extension is of the form L3_BRS_ttt, where ttt represents the binning period length.

For the sample SMI product names given in the Ocean Color Level-3 Standard Mapped Image Product description, the following browse products would be generated:

```
day:    S1998001.L3_BRS_DAY
8-day:  S19980171998024.L3_BRS_8D
month:  S19980321998060.L3_BRS_MO
year:   S19980011998366.L3_BRS_YR
```

3.0 Global Attributes

For global attributes that have constant values specific to this product type, the actual value is given.

3.1 Mission and Documentation

This section lists attributes which are common to all sensors, followed by sensor-specific attributes.

3.1.1 Common Attributes

Product Name (character): the name of the product file (without path).

Title (character): "SeaWiFS Level-3 Browse Data", "MODISA Level-3 Browse Data" or "OCTS Level-3 Browse Data".

Legend (character): "NASA/GSFC SSS Level-3 chlorophyll a browse data, day *DDD*, *YYYY*", where SSS is "SeaWiFS", "MODISA" or "OCTS", and *DDD* and *YYYY* are the day and year portions of the **Start Time**.

Sensor Name (character): "SeaWiFS", "MODISA" or "OCTS".

Replacement Flag (character): "ORIGINAL" if this is the first version of this product delivered to the DAAC; otherwise, it is set to the name of the product to be replaced (superseded) by the present product.

Software Name (character): "l3brsgen"; name of the software used to create this product.

Software Version (character): version of the software used to create this product.

Processing Time (character): local time of generation of this product; concatenated digits for year, day-of-year, hours, minutes, seconds, and fraction of seconds in the format of YYYYDDDHMMSSFFF.

Input Files (character): the name of the SMI file (without path) from which the current product was created. This information is stored in the product as part of its processing history.

Processing Control (character): all input and processing control parameters used by the calling program to generate the product. Vertical bars or carriage return characters serve as parameter information delimiters. This information is stored in the product as part of its processing history.

Processing Log (character): no longer filled.

3.1.2 SeaWiFS-Specific Attributes

Data Center (character): "NASA/GSFC SeaWiFS Data Processing Center".

Mission (character): "SeaStar SeaWiFS".

Mission Characteristics (character): "Nominal orbit: inclination = 98.2 (Sun-synchronous); node = 12 noon local (descending); eccentricity = <0.002; altitude = 705 km; ground speed = 6.75 km/sec".

Sensor (character): "Sea-viewing Wide Field-of-view Sensor (SeaWiFS)".

Sensor Characteristics (character): "Number of bands = 8; number of active bands = 8; wavelengths per band (nm) = 412, 443, 490, 510, 555, 670, 765, 865; bits per pixel = 10; instantaneous field-of-view = 1.5835 mrad; pixels per scan = 1285; scan rate = 6/sec; sample rate = 7710/sec". Note: Pixels per scan, scan rate, and sample rate are given for the sensor; effective rates for GAC data are lower due to subsampling.

Station Name (character): "Wallops Flight Facility".

Station Latitude (4-byte real): 37.9272.

Station Longitude (4-byte real): -75.4753.

3.2 Parent Product Information

The following attributes refer to the parent SMI product.

Parent Input Files (character): the name of the Level-3 binned data product (main file name without path) from which the parent product was created.

Product Type (character): "day", "8-day", "month", or "year".

Parent Number of Lines (4-byte integer): 2,048; number of points in the vertical (longitudinal) direction.

Parent Number of Columns (4-byte integer): 4,096; number of points in the horizontal (latitudinal) direction.

3.3 Data Time

The values of the following attributes are identical to those of the parent SMI product.

Period Start Year (2-byte integer): year of start of binning period (cf. **Start Year**).

Period Start Day (2-byte integer): GMT day-of-year of start of binning period (cf. **Start Day**).

Period End Year (2-byte integer): year of end of binning period (cf. **End Year**).

Period End Day (2-byte integer): GMT day-of-year of end of binning period (cf. **End Day**).

Start Time (character): data start GMT; concatenated digits for year, day-of-year, hours, minutes, seconds, and fraction of seconds in the format of YYYYDDHMMSSFFF.

End Time (character): data end GMT; concatenated digits for year, day-of-year, hours, minutes, seconds, and fraction of seconds in the format of YYYYDDHMMSSFFF.

Start Year (2-byte integer): GMT year of data start.

Start Day (2-byte integer): GMT day-of-year of data start.

Start Millisec (4-byte integer): GMT milliseconds-of-day of data start.

End Year (2-byte integer): GMT year of data end.

End Day (2-byte integer): GMT day-of-year of data end.

End Millisec (4-byte integer): GMT milliseconds-of-day of data end.

Orbit (4-byte integer): number of the orbit crossing 180° longitude closest to equator at the start.

Start Orbit (4-byte integer): number of the first orbit that may have contributed data.

End Orbit (4-byte integer): number of the last orbit that may have contributed data.

3.4 Scene Coordinates

The values of the following attributes are identical to those of the parent Level-3 SMI product.

Map Projection (character): "Equidistant Cylindrical".

Latitude Units (character): "degrees North"; units used for all latitude values in this product.

Longitude Units (character): "degrees East"; units used for all longitude values in this product.

Northernmost Latitude (4-byte real): 90.0.

Southernmost Latitude (4-byte real): -90.0.

Westernmost Longitude (4-byte real): -180.0.

Easternmost Longitude (4-byte real): 180.0.

3.5 Browse Image Information

Parameter (character): "Chlorophyll a concentration".

Measure (character): "Mean".

Units (character): "mg m⁻³".

Start Column (4-byte integer): the first column of each line in the parent product used to create this product; values are 1-relative; normally, 1.

Column Subsampling Rate (4-byte integer): the column subsampling rate (starting with **Start Column**) used on parent product to create this product; normally, 8.

Number of Columns (4-byte integer): number of points in the horizontal (latitudinal) direction of **brs_data**; equals the integer portion of $((\text{Parent Number of Columns} - \text{Start Column}) / \text{Column Subsampling Rate}) + 1$.

Start Line (4-byte integer): the first image line in the parent product used to create this product;

values are 1-relative; normally, 1.

Line Subsampling Rate (4-byte integer): the image line subsampling rate (starting with **Start Line**) used on parent product to create this product; normally, 8.

Number of Lines (4-byte integer): number of points in the vertical (longitudinal) direction of **brs_data**; equals the integer portion of $((\text{Parent Number of Lines} - \text{Start Line}) / \text{Line Subsampling Rate}) + 1$.

Scaling (character): "logarithmic".

Scaling Equation (character): "Base**((Slope*brs_data) + Intercept) = chlorophyll a".

Base (4-byte real): 10.0; used to convert the byte values (0-250) of **brs_data** into mg m^{-3} of chlorophyll a: $\text{Base}^{((\text{Slope} * \text{brs_data}) + \text{Intercept})} = \text{chlorophyll a}$.

Slope (4-byte real): 0.015; used to convert the byte values (0-250) of **brs_data** into mg m^{-3} of chlorophyll a: $\text{Base}^{((\text{Slope} * \text{brs_data}) + \text{Intercept})} = \text{chlorophyll a}$.

Intercept (4-byte real): -2.0; used to convert the byte values (0-250) of **brs_data** into mg m^{-3} of chlorophyll a: $\text{Base}^{((\text{Slope} * \text{brs_data}) + \text{Intercept})} = \text{chlorophyll a}$.

4.0 Raster and Palette

brs_data (byte, array size **Number of Lines** x **Number of Columns**): raster image array of chlorophyll a data; may be converted into real values using **Base**, **Slope**, and **Intercept**; has an associated palette (byte, array size 3 x 256) of red, green, and blue weights for each of 256 (0 to 255, respectively) possible **brs_data** byte values. Byte values 251 to 255 in the raster image are reserved to indicate certain conditions (in the order of highest to lowest priority): 251 for image caption, 254 for political boundaries (including coastlines), 252 for geocoordinate grid, 253 for land, and 255 if the corresponding grid point in the parent SMI product is 255 (indicating no data).